

Iowa Agricultural Education Competency Lists

June 1999

Validated/Minimum Competencies
for educational programs in the areas of:

Agricultural Business, Service and Supply
Agricultural Production
Agricultural Mechanics
Horticulture
Agricultural Products and Processing
Natural Resources

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Iowa Agricultural Education Competency Lists

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Agricultural Education Competency Lists

Introduction

This document is a compilation of minimum competencies to be included in the study of the seven occupational areas of agriculture at the secondary school level: Agricultural Sales & Service, Agricultural Production, Agricultural Mechanics, Horticulture, Agricultural Products & Processing, Forestry, and Conservation & Natural Resources. In this document, we have combined Forestry and Conservation & Natural Resources under one title of Natural Resources. Also, the terms Agricultural Business has been added to the terms Service & Supply. One of the lists is entitled “Technology”. The items in this list can be a part of each of the other areas.

The reader should note that these lists consist of MINIMUM competencies. This document is NOT a compilation of all the knowledge and skills to be learned in each occupational area. Local program content and delivery are dependent on inputs from learners, teachers, advisory councils, parents, employers and other stakeholders.

The competencies listed in this document have been identified and validated by leaders and professionals in each of the occupational areas. The latest validation process was conducted in 1999.

Readers should use this updated list as a source for guidance in constructing their curriculum guides for secondary school programs in agriculture.

Occupational

1. Identify the three components of management.
2. Explain the relationship of land, labor, and capital to management.
3. Identify agricultural career opportunities in management, sales and service.
4. Describe the types of record keeping systems used in agriculture.
5. Develop a process for accurately determining business inventory.
6. Utilize accounting procedures to record cash receipts and expenditures.
7. Develop a balance sheet for business.
8. Complete a net worth statement.
9. Identify appropriate financial ratios.
10. Explain the different types of budgets used in business.
11. Prepare an enterprise budget.
12. Identify variable cost.
13. Explain fixed cost.
14. Calculate a least-cost ratio.
15. Explain opportunity cost.
16. Complete a cash flow projection worksheet.
17. Identify types of credit.
18. Determine available credit resources.
19. Calculate the time value of money.
20. Calculate the payback period for an investment. Identify procedures for determining the market value of assets used in depreciation and inventory schedules.
21. List the steps used in purchasing fixed and variable assets in a business.
22. Complete a personal income tax form.
23. Explain the components of a local property tax.
24. Explain social security taxes and their benefit related to types of employment.
25. Demonstrate the impact of the state sales tax on purchases.
26. Identify the four types of agricultural business organizations.
27. Compare the advantages and disadvantages of the four types of agricultural business.
28. Analyze the common types of financial and legal agreements used in agriculture.
29. Identify resources for technical assistance.
30. Identify governmental regulatory agencies related to agribusiness.
31. Identify current government programs that support agricultural business.
32. Determine the types of insurance available for both personal and business needs.
33. List the purposes of governmental farm agencies.
34. Analyze marketing and pricing alternatives for agricultural commodities.
35. Differentiate between marketing, pricing, and grading standards for agricultural commodities.
36. Identify sources of marketing information.
37. Calculate storage charges on grain.
38. Demonstrate the principles of effective selling.
39. List the methods used to advertise an agricultural product.
40. Explain the developmental process used to prepare an appropriate advertisement.
41. Write a sales ticket.
42. Calculate margins and discounts for agricultural supplies.
43. Identify the different types of discounts used in agricultural sales to increase sales.
44. Make change correctly.
45. Operate office equipment.
46. Utilize a data-base, word-processing, and spreadsheet program.
47. Balance daily cash receipts.
48. Balance monthly bank statements.
49. Calculate finance charges.
50. Develop a process for ordering and receiving goods based on inventory needs.

51. Generate periodic billing statements.
52. Explain factors in pricing agricultural merchandising.
53. Demonstrate proper telephone answering skills.
54. Identify livestock facility requirements.
55. Identify factors that are important to human relations in business.
56. Identify feedstuffs and additives available for specific livestock enterprises.
57. Explain the nutritional value of feedstuffs and additives as related to specific livestock enterprises.
58. Interpret charts, graphs, and maps to make specific decisions related to business.
59. Balance a ration in accordance to the nutritional requirements of an animal species.
60. Explain the functions of the monogastric digestive system.
61. Diagram the ruminant digestive system.
62. Identify procedures for developing a quality livestock disease prevention program

63. Demonstrate the proper procedures for administering of animal health products.
64. Evaluate livestock for profitable production traits.
65. Identify the types of wholesale and retail cuts of meat.
66. Explain methods for the proper handling and disposal of animal waste.
67. Determine appropriate land use management based on soil evaluation needs.
68. Read a soil classification map.
69. Interpret the results from a soil and/or tissue test.
70. Explain how the selection of hybrid and certified seed affects performance and profitability.
71. Explain the principles of plant breeding.
72. Identify the types of tillage methods used in crop production.
73. Describe the types of harvesting systems used in crop production.
74. Explain the role of primary and secondary nutrients used in crop production.
75. Select appropriate commercial fertilizers and chemicals based on identified needs.
76. Calculate the amount of fertilizer and/or chemicals needed for a specific task or recommendation.
77. Calibrate fertilizer and chemical equipment.
78. Compare the advantages and disadvantages of biological, chemical and cultural pest controls.
79. Perform routine maintenance on agricultural equipment using service manual schedules.
80. Identify different production techniques and their effect on the environment.
81. Perform plant propagation using sexual, asexual or tissue culture techniques.
82. Demonstrate the proper procedure for planting trees and shrubs.
83. Identify opportunities for the development of diversified crop and/or livestock enterprises.
84. Identify the types of production systems used worldwide and their impact.
85. Determine the impact of biotechnology on world food production systems.
86. Identify the monetary systems of selected countries and their impact on the United States.
87. Explain how the production of one country impacts the production of another.
88. Locate on a map each of the major continents of the world.
89. Locate on a map each of the major agricultural regions of the world.
90. Explain the impact of government policy on the production and marketing of various commodities.
91. Determine the political role of governments and their impact on food production.
92. Compare the differences between measurement systems in the United States and the world.
93. Use the metric system to calculate specific weights and measurement.
94. Explain the linkage between culture and diet.

Leadership

1. Listen effectively.
2. Follow directions.
3. Manage conflict (personal and customer).
4. Prioritize a series of tasks.
5. Utilize time effectively.
6. Speak effectively in front of others.
7. Work effectively with others.
8. Define goals.
9. Delegate duties.

10. Adapt to environment/situation.
11. Facilitate group interaction (teamwork).
12. Lead a discussion.
13. Organize an event.
14. Become personally involved in professional organizations.

Job Getting, Job Keeping

1. Identify skills, physical and emotional requirements for a job.
2. Complete required forms.
3. Construct an application letter.
4. Evaluate a job offer, benefits, time, and working environment.
5. Interact with others in a courteous and tactful manner.
6. Cooperate with others.
7. Accept individual differences.
8. Respect the property of others.
9. Organize thoughts and clearly express point of view.
10. Organize thoughts and write clearly.
11. Exhibit dependability responsibility on the job.
12. Demonstrate punctuality.
13. Ask for help when needed.
14. Accept new challenges.
15. Demonstrate initiative.
16. Accept supervision willingly.
17. Adapt to change/demonstrate flexibility.
18. Manage time effectively.
19. Follow rules and regulations.
20. Product quality work.
21. Work within guidelines
22. Take responsibility for mistakes and/or good work.
23. Comply with safety and health rules.
24. Utilize equipment correctly as shown/demonstrated by supervisor.
25. Compose a resume.
26. Maintain clean and orderly work area.
27. Demonstrate personal hygiene and cleanliness.
28. Explain the relationship between public and private sectors.
29. Explain the concept of competition.
30. Analyze the concept of supply and demand.
31. Explain the concept of organized labor and business.
32. Explain the concept of business cycles.
33. Explain the nature of international trade.
34. Explain the concept of profit.
35. Demonstrate proper telephone etiquette.

Entrepreneurship

1. Analyze business organizations.
2. Identify skills required of a business owner.
3. Recognize relevant, ethical issues in business.
4. Identify the personal characteristics of entrepreneurs.
5. Analyze the contents of a business plan.
6. Recognize the importance of technical assistance.
7. Explain types of business ownership.
8. Identify factors in obtaining finances for a new business.
9. Demonstrate the ability of market analysis.
10. Develop positive community relations.

Agricultural Production

Occupational

1. Follow procedures in identification, handling and disposal of hazardous materials.
2. Identify basic laws and governmental regulations related to agricultural production.
3. Analyze the environmental effect that agricultural stewardship may have on surface and ground water, wildlife, soil, air, and people.
4. Identify career opportunities in production agriculture.
5. Evaluate various animal feeding programs including ration development and feedstuff analysis.
6. Plan an animal health program/schedule with emphasis toward Quality Assurance.
7. Identify major genetic characteristics of animal breeds (including hybrids) and examine their uses in animal breeding systems and scientific principles.
8. Demonstrate safe and humane animal handling techniques.
9. Identify major genetic characteristics of animal breeds and plant varieties.
10. Evaluate agricultural product quality.
11. Analyze various animal testing programs.
12. Plan an animal health program/schedule.
13. Identify and compare the operation of equipment and facilities involved with livestock for optimum production efficiency.
14. Complete the course work for current and evolving certification or licensure requirements in production agriculture.
15. Analyze the economic impact of production agriculture on the economy.
16. Utilize computerized record analyze in making production, management and marketing decisions.
17. Explain practices to ensure food safety for the consumer.
18. Identify domestic and global niche markets and analyze the production requirements.
19. Explain soil and water conservation practices and their part with Federal Program Compliance.
20. Utilize digitized soil surveys to establish a soil sampling methods and formulate a nutrient.
21. Explain the factors involved with seed and plant selection.
22. Identify and demonstrate plant growth and reproduction.
23. Identify and select biological and chemical pest controls for agronomic production.
24. Design storage establishment improvement practices/grazing systems.
25. Identify and compare the operation of grain harvesting, handling, drying, and storage systems.
26. Compare agronomic production systems.
27. Adjust and calibrate agriculture equipment.
28. Evaluate and demonstrate use of current technology in land surveying and measuring.
29. Repair/condition/service agricultural equipment.
30. Identify components of water systems.
31. Demonstrate knowledge of safe and proper operation of tools and equipment.
32. Demonstrate carpentry skills needed in agriculture.
33. Demonstrate welding and cutting skills.
34. Demonstrate and calculation, forming, placing, and finishing of concrete.
35. Identify and evaluate various energy and power sources.
36. Develop and implement a business plan for crop/animal production.
37. Analyze present and future business resource base.
38. Identify necessary financial components for a production agricultural business.
39. Identify risk components and analyze management strategies.
40. Determine personal attitude toward business risk.
41. Determine marketing systems, methods, and strategies.
42. Utilize past, current, and future trends to analyze and interpret charts, graphs, and other information to develop management decisions.
43. Analyze components of labor management.
44. Analyze components involved in contracting services for the product agricultural business.
45. Identify components needed for appropriate tax information.
46. Identify the impact of positive community elations through communications, business appearance and practices in addition to personal involvement in related professional organizations.

Leadership

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7. Work effectively with others.
8. Define goals.
9. Delegate duties.
10. Adapt to environment/situation.
11. Facilitate group interaction (teamwork).
12. Lead a discussion.
13. Organize an event.
14. Become personally involved in a professional organization.

Job Getting, Job Keeping

1. Identify skills, physical and emotional requirements for a job.
2. Complete required forms.
3. Construct an application letter.
4. Evaluate job offer, benefits, time, and working environment.
5. Interact with others in a courteous and tactful manner.
6. Cooperate with others.
7. Accept individual differences.
8. Respect the property of others.
9. Organize thoughts and clearly express point of view.
10. Organize thoughts and write clearly.
11. Exhibit dependability responsibility on the job.
12. Demonstrate punctuality.
13. Ask for help when needed.
14. Accept new challenges.
15. Demonstrate initiative.
16. Accept supervision willingly.
17. Adapt to change/demonstrate flexibility.
18. Manage time effectively.
19. Follow rules and regulations.
20. Produce quality work.
21. Work within guidelines.
22. Take responsibility for mistakes and/or good work.
23. Comply with safety and health rules.
24. Utilize equipment correctly as shown/demonstrated by supervisor.
25. Compose a resume.
26. Maintain clean and orderly work area.
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28. Explain the relationship between public and private sectors.
29. Explain the concept of competition.
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Entrepreneurship

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5. Recognize the importance of technical assistance.
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9. Develop positive community relations.

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Agricultural Mechanics

Occupational

1. Describe characteristics of a quality weld.
2. Explain arc, braze, and wire fed welding terms and principles.
3. Set up equipment, prepare metal and complete corner, fillet, lap and butt welds on mild steel in various positions with wire fed braze and arc welders.
4. Differentiate between cast iron, metallic arc, gas tungsten, TIG, oxy/act. Welding including the selection of equipment and supplies.
5. Set up and maintain equipment, cut a hole, straight line, and bevel on flat mild steel using a gas torch and/or plasma cutter.
6. List the advantages of brazing and complete a braze weld using gas welding equipment.
7. Describe ingredients and mixes of high quality concrete.
8. Calculate the volume of concrete to be ordered based on a design plan.
9. Demonstrate site preparation, placement and proper curing of quality concrete.
10. Describe wiring standards for agricultural applications.
11. Describe basic principles of electricity and define electrical related terminology.
12. Describe importance of proper grounding systems and ground-fault protection.
13. Describe relationship between volts, ohm, amps, watts and kilowatts.
14. Identify symbols from basic wiring circuits.
15. Measure and trouble shoot electrical circuits (to include charging and starting systems) using a circuit test.
16. Demonstrate installation of a simple electrical circuit with switch, receptacles, and over current protection.
17. Demonstrate work with electricity in a safe manner.
18. Identify factors for selecting motors and protection devices based upon types of application.
19. Complete the following plumbing joints: plastic, copper solder, compression joints and threaded pipe.
20. Explain functions and applications of electrical circuits and sensors used in agricultural equipment.
21. Explain the function and operating principles of two-stroke and four-stroke gasoline diesel engine systems.
22. Perform routine care, maintenance and perform tune-up of a gasoline engine.
23. Utilize service or operator's manuals, and catalogs to complete a job.
24. Explain the terms compression ratio, and piston displacement.
25. Perform a four-stroke or two-stroke cycle engine overhaul.
26. Troubleshoot and diagnose malfunctions pertaining to engines.
27. Select and properly use hand and power tools.
28. Determine tap and die sizes and thread pitch.
29. Demonstrate proper measurement and layout of a mechanics project.
30. Select abrasives for grinding and sharpening.
31. Recondition tools such as twist drill, chisels, punches.
32. Explain the relationship among pressure, velocity, flow and power in a hydraulic system.
33. Select hydraulic components from a vendor's sales literature.
34. Identify components of hydraulic systems.
35. Describe basic hydraulic functions including fluids, fluid cleanliness and filtration.
36. Select fuels, lubricants, hydraulic fluids and filters by service classifications.
37. Interpret and follow recommended service and maintenance schedules using operator's manuals.
38. Identify and compute harvest losses.
39. Demonstrate adjustment or calibration seeding, fertilizing, spraying, harvesting, tillage, or processing machinery.
40. Compare types of drives, used in agricultural machinery.
41. Identify common applications of agricultural machinery and major trends in technology.
42. Interpret plans and working drawings.
43. Sketch a simple line drawing of a three dimensional object showing top, bottom, and front views.
44. Identify basic structural parts of a building.
45. Identify environmental problems in agricultural structures such as livestock buildings and chemical storage facilities.

46. Plan and evaluate farmstead and agricultural building design and layout.
47. Demonstrate use of level for determining slope for building layout.
48. Identify types of erosion control structures.
49. Complete a simple construction project of good quality.
50. Develop a bill of materials and projected cost list.
51. Identify common building materials, hardware and their uses.
52. Calculate board feet, square feet, and linear foot of lumber or metal.
53. Use basic computer functions or word processing, spreadsheet, and database management.
54. Describe career opportunities in various areas of agricultural mechanics.
55. Explain basic procedures for emergency rescue involved in agricultural related accidents.
56. Use shop tools in a safe manner.
57. Handle hazardous chemicals and flammable materials according to product label.
58. Operate agricultural equipment in a safe manner.

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Entrepreneurship

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4. Identify the personal characteristics of entrepreneurs.
5. Analyze the contents of a business plan.
6. Recognize the importance of technical assistance.
7. Explain types of business ownership.
8. Identify factors in obtaining finances for a new business.
9. Demonstrate the ability of market analysis.
10. Develop positive community relations.

Horticulture

Occupational

1. Use observational techniques to identify healthy, quality plants.
2. Explain the process of photosynthesis.
3. Explain factors affecting plant growth: light, water, temperature, humidity, nutrients (micro/macro) soils, atmosphere, and pollutants.
4. Explain the principles of nutrient uptake.
5. Define and identify hardiness zones.
6. Explain the system of scientific nomenclature for plants (e.g., families, genus, species).
7. Explain plant propagation from seed, cuttings, divisions, and layering.
8. Take soil samples.
9. Interpret data of soil sample analysis.
10. Fertilize media/soil.
11. Apply nutrients, soil amendments, by preparing a compost.
12. Plan planting schedules.
13. Prepare/plant seeds.
14. Label plants.
15. Identify growing structures utilized in horticulture.
16. Identify issues and trends in horticulture concerning environmental and conservation problems.
17. Observe commercial and residential irrigation systems.
18. Identify and differentiate between (may be a combination of) disease damage, pest and insect damage, chemical and environmental damage in a plant.
19. Explain the principles of integrated pest management.
20. Identify common weeds.
21. Explain how to safely mix, apply, store, transport and dispose of chemicals and chemical containers.
22. Explain and demonstrate first aid practices when using chemicals.
23. Use correct horticulture terminology.
24. Explain current/future trends in horticulture.
25. Perform basic maintenance practices on gasoline and diesel engines.
26. Maintain large and small tools and implements.
27. Operate lawnmower, small tractor, weed trimmer, backpack sprayer, hand sprayer and edger safely.
28. Use proper equipment in all aspects of horticulture.
29. Identify career opportunities in the horticulture industry.
30. Explain the use of a scale, cash register, and charge card authorization system.
31. Make change properly.
32. Complete business forms (invoices, sales slips, charge card forms) correctly.

33. Demonstrate interactions with customer (i.e. determine consumer need and provide technical assistance).
34. Develop a promotional display.
35. Demonstrate taking and processing telephone orders.
36. Demonstrate handling customer complaints and returned purchases.
37. Explain how to develop and use a customer file system.
38. Label and price products.
39. Explain how to maintain product and sales area of store.
40. Identify basic inventory procedures and techniques.
41. Use a word processing, database and spreadsheet program.
42. Use "standard" units of measurement accurately in the various areas of horticulture.
43. Identify plants using a botanical key.
44. Identify herbaceous and woody ornamental plants by common name.
45. Explain the process of producing, harvesting, and storing ornamental plants (i.e., trees, shrubs, Christmas trees, and perennials).
46. Prepare planting media.
47. Prepare/plant bulbs, corms, tubers, rhizomes, and roots.
48. Prepare/transplant trees and shrubs and seedlings.
49. Prepare/transplant trees, shrubs, and herbaceous perennials for container production.
50. Prune or shear plants and trees in an appropriate manner.
51. Explain how to set up a maintenance schedule.
52. Interpret landscape plans.
53. Explain the basic principles of landscape design.
54. Use drafting techniques to draw a basic design plan to scale.
55. Develop a planting plan.
56. Choose plants of appropriate mature size, shape, texture, and function for a given site.
57. Install landscape material.
58. Identify different landscape structures and the materials used in their construction.
59. Measure a tree trunk accurately using a caliper.
60. Identify Midwestern turf grasses by common name.
61. Explain lawn and turf maintenance.
62. Prepare site and install sod and/or seed.
63. Explain the principles of aerating turf.
64. Identify Midwestern fruits and nuts by common name.
65. Identify vegetables and herbs by common name.
66. Explain the propagation of plants by budding, grafting, and tissue culture techniques.
67. Explain the process of maintaining orchards and vineyards and the harvesting and storing of fruit.
68. Explain the process of producing, harvesting, and storing fruits and vegetables.
69. Identify soil types for their fruit and vegetable production characteristics.
70. Prepare/transplant seedlings, cuttings, and daughter plants.
71. Develop a vegetable garden plan.
72. Identify floriculture crops including houseplants by common name.
73. Explain the process of producing, harvesting, and storing greenhouse crops.
74. Produce, harvest, and store greenhouse crops.
75. Maintain houseplants.
76. Prepare plant media.
77. Explain process of and reasons for pasteurization and fumigation of soil mixes.
78. Explain growth-regulating chemicals.
79. Force bulbs (control temperature, moisture, and light).
80. Adjust or control closed environmental factors: water, heat, cold, humidity, air circulation, and ventilation.
81. Define production practices for greenhouse pot crops.
82. Identify common tools and mechanics used in arranging flowers.
83. Identify the types of flowers/greens that can be used in floral design.
84. Identify the basic principles of floral design.
85. Perform basic wiring and taping techniques.
86. Design and construct fresh floral arrangements.
87. Construct bows using basic ribbon width.
88. Construct different types of body flowers.
89. Construct floral design using holiday greens.

90. Prepare, design and plant a dish garden.
91. Package florist flowers/arrangements for delivery.
92. Demonstrate the construction of a wedding or funeral design.
93. Properly care for and prepare fresh cut plant materials for use in floral design.
94. Prepare a green or flowering plant for sale.
95. Choose an appropriate plant for a specific location in a home or business.
96. Explain wiring floral products by telephone/internet.

Leadership

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7. Work effectively with others.
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Job Getting, Job Keeping

1. Identify skills, physical and emotional requirements for a job.
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10. Organize thoughts and write clearly.
11. Exhibit dependability/responsibility on the job.
12. Demonstrate punctuality.
13. Ask for help when needed.
14. Accept new challenges.
15. Demonstrate initiative.
16. Accept supervision willingly.
17. Adapt to change/demonstrate flexibility.
18. Manage time effectively.
19. Follow rules and regulations.
20. Produce quality work.
21. Work within guidelines.
22. Take responsibility for mistakes and/or good work.
23. Comply with safety and health rules.
24. Utilize equipment correctly as shown/demonstrated by a supervisor.
25. Compose a resume.
26. Maintain clean and orderly work area.
27. Demonstrate personal hygiene and cleanliness.
28. Explain the relationship between public and private sectors.
29. Explain the concept of competition.
30. Analyze the concept of supply and demand.
31. Explain the concept of organized labor and business.
32. Explain the concept of business cycles.
33. Explain the nature of international trade.

34. Explain the concept of profit.
35. Demonstrate proper telephone etiquette.

Entrepreneurship

1. Analyze business organizations.
2. Identify skills required of a business owner. Recognize relevant, ethical issues in business.
3. Recognize relevant, ethical issues in business.
4. Identify the personal characteristics of entrepreneurs.
5. Analyze the contents of a business plan.
6. Recognize the importance of technical assistance.
7. Explain types of business ownership.
8. Identify factors in obtaining finances for a new business.
9. Demonstrate the ability of market analysis.
10. Develop positive community relations.

Agricultural Products & Processing

Occupational

1. Explain the importance of quality assurance of food and fiber products.
2. Explain the concepts of food sanitation and safety.
3. Identify the parts of plants and animals used in processed food and fiber products.
4. Identify governmental agencies and structure regulating food products.
5. Explain the basic microbiological concepts associated with food and fiber products including applications to the sanitary operation of the physical plant.
6. Identify and describe the entrepreneurial, economic, and business management skills associated with the on-going production, processing and distribution of the agricultural products.
7. Identify the skills needed to become a productive and efficient worker in a production, processing, or distribution business.
8. Identify geographic areas where product processing occurs and the reason why.
9. Explain the impact global international markets have on products and processing.
10. Describe how health concerns, consumer issues, and political groups impact products and processing.
11. Explain how trends in convenience buying have impacted processing and packaging.
12. Analyze the food distribution system in the U.S. and other nations.
13. Demonstrate computer skills for business applications (i.e., spreadsheets, Internet, information management, word processing, and database).
14. Explain the importance of safety in the workplace and demonstrate first aid techniques used in the work related accident.
15. Describe quality factors for agricultural products (i.e., meats, grains, fiber, fruits, and vegetables, etc.).
16. Identify packaging methods of agricultural products and their impact on quality and distribution.
17. Identify the various agricultural products produced and processed in Iowa (i.e., fruits and vegetables, grains, meat, dairy, etc.).
18. Identify the various agricultural processing methods for agricultural products (i.e., irradiation, dried, frozen, thermo, fresh, vacuum sealed, canned, juiced, etc.).
19. Interpret information on a packaging label (i.e., foods, pesticides, and antibiotics).
20. Identify the use of chemicals and biological agents that affect agricultural processing.
21. Identify how genetically altered agricultural products affect the marketing of those agricultural products.
22. Demonstrate methods for storing and monitoring agricultural products (i.e., drying corn, moisture testing, insect damage. etc.).
23. Demonstrate the importance of operating and reading measuring devices accurately.
24. Use basic addition, subtraction, multiplication and division to formulate agricultural products for processing and/or packaging.
25. Identify occupational opportunities available to the area of agricultural products and processing.
26. Demonstrate the use of the various measuring systems used in the U.S. and in other countries and explain the benefits and show conversions of the various measuring systems.
27. Explain the ethical and cultural concerns of biotechnology in agricultural processing.

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Entrepreneurship

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Natural Sciences

Occupational

1. Identify a minimum of five (5) environmental and natural resource occupations and explain the job requirements, major activities performed by persons in these occupations and availability by location.
2. Explain the connection between the natural resources occupations, agribusiness, and technology.
3. Explain the impact agriculture, industry, and population centers have on natural resources and the environment.
4. Use soil survey, topography maps, aerial photos, and other natural resources Inventories to interpret, compare (limits and potentials), and plan wise land management.
5. Identify federal, state, and local regulations related to soil and water conservation, water quality, forestry, air quality, and wildlife. Explain their applicability to resource management.
6. Write a legal description of a selected piece of land.
7. Locate a plot of land given a legal description.
8. Explain basic soil morphology and its relationship to management.
9. Demonstrate general computer literacy, word processing, information gathering, and database operation.
10. Describe the types of wind and water erosion and determine soil erosion rates and resulting economic and environmental losses to society.
11. Select appropriate conservation practice that will reduce erosion and improve water quality on a farm and urban area.
12. Evaluate alternative agricultural systems based on productivity, profitability, environmental considerations, and social acceptance.
13. Develop an individual resource conservation plan to include crop, pasture, woodlands, wildlife, farmstead, and urban considerations.
14. Measure and calculate land area, length, and percent slope.
15. Determine soil amendments necessary based on soil tests, realistic yield goals, and the fertility level of a given piece of land.
16. Identify and evaluate conservation tillage systems and their productivity, profitability and environmental impact.
17. Explain the techniques of crop cultivation and how they interrelate with the environment.
18. Identify a minimum of 50 plants by their common name.
19. Evaluate benefits and uses of native plants and animals as well as their negative uses.
20. Explain the role of test plots in evaluating agricultural management practices.
21. Explain the hydrologic cycle.
22. Identify local sources of water for public, home, industrial, recreational and agricultural uses.
23. Identify primary sources of ground and surface water contamination and explain techniques for protecting these resources.
24. Explain the importance of protecting ground and surface water resources.
25. Evaluate means of solving local water resource problems.
26. Collecting, understanding, and analyzing samples to assess water quality and analyze findings.
27. Estimate water needs for a community and farm operation.
28. Evaluate various solid waste disposal systems by their environmental impact.
29. Identify techniques for improvement of aquatic habitats.
30. Identify a minimum of 10 aquatic plants and 10 aquatic animals common to Iowa.
31. Develop a wildlife management plan for a given area.
32. evaluate means of solving local wildlife resource problems.

33. Identify types of hunting leases and liability involved.
34. Determine crops and crop management that will provide habitat for wildlife.
35. Perform wildlife habitat improvements. Be knowledgeable of wildlife habitat technologies.
36. Identify a minimum of 30 Iowa wildlife species to include game, non-game, and endangered species.
37. Explain a minimum of 5 timber stand improvement practices.
38. Identify woodland changes caused by pests and fire.
39. Explain important principals and economic values in managing trees for wood products, Christmas tree production, wildlife, recreation, windbreak, water recycling, air pollution, and energy.
40. Evaluate means of solving Iowa forest resource problems.
41. Identify a minimum of fifteen (15) Iowa tree species and their common uses and planting objectives.
42. Demonstrate the proper planting of a tree based on soil conditions, size conditions, and land use objectives.
43. Describe how Iowa climate and weather is relevant to natural resources and agricultural resource management.
44. Evaluate alternative solutions to Iowa air pollution problems.
45. Read manuals and labels to properly use agricultural equipment, chemicals, and other agricultural inputs correctly and safely.
46. Explain the principles of integrate crop (fertility levels, pests) management.
47. Identify contemporary natural resources issues/concerns relating to agriculture.
48. Explain proper stocking and management of farm ponds.
49. Explain current issues involved in natural resource management.
50. Explain harvest management techniques and regulations.
51. Describe global environmental impact.
52. Explain global positioning systems and graphic information systems and understand practice application.
53. Operate office equipment (e-mail, fax, phone innovations, etc.).
54. Describe current animal waste regulations as they apply to the environment.
55. Explain State and Federal AG and Natural Resource Management Agencies and their functions.
56. Identify the role geologic resources have in land use planning.
57. Evaluate and incorporate alternative fuel resources.
58. Explain the economic impact of the loss of wildlife, habitat, urban sprawl, and navigation on wildlife resources.
59. Identify the agricultural impact of groundwater resource availability, management, and use.
60. Select alternative grazing practices to eliminate grazing of woodlands.
61. Identify alternative forest management practices that reduce "high grading" of timber harvest.
62. Describe the connections between land use, rural Iowa, and agriculture.
63. Develop plans which incorporate the use of federal, state, and local agriculture programs to sustain resources (i.e., buffer strips).
64. Incorporate wildlife depredation prevention into animal husbandry practices.
65. Assess and implement BMPs (Best Management Practices) related to agriculture drainage wells, erosion control, irrigation of wastewater, irrigation of groundwater, use of storage tanks (i.e., fuels, Anhydrous Ammonia, etc.) and wellhead and source of water protection which improve water quality.
66. Identify and incorporate nutrient management practices including spreading lagoon fertilizers, commercial applicator training, composting of manure and animal carcasses, managing wastes from food processing facilities through composting, developing manure management plans, the application of municipal sludge, and the storage, handling, and transfer of chemicals into agricultural plans.
67. Identify BMPs (Best Management Practices) for proper asbestos removal from agriculture facilities.
68. Identify BMPs (Best Management Practices) for management of solid wastes from agriculture facilities (i.e., reduce burning and on-site disposal).
69. Identify BMPs (Best Management Practices) for the management of vehicular wastes (i.e., oil antifreeze, lead batteries, tires, etc.).

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Technology

Occupational

1. Show awareness of the tools of precision farming.
2. Describe the importance of graphic information systems in precision farming.
3. Describe the role of graphic information systems in precision farming.
4. Describe the role of VRT in precision farming.
5. Describe the value of precision farming in agriculture.
6. Use the graphic information system receiver to record a coordinate position of some point.
7. List specific objects that can be mapped.
8. Recognize what a coordinate system is.
9. Use the survey plat of township, range and section to describe an area.
10. Define precision farming.
11. Show awareness of relationships between mapped objects.
12. Describe basic hardware components.
13. Use the following hardware components: keyboard, mouse, disk drive, monitor.
14. Recognize what the operating system of a computer is.
15. Use an operating system to: open or close programs, list files or program and file management.
16. List specific biotechnology products in use.
17. Recognize what DNA is.
18. Describe the role DNA plays in an animal's phenotype.
19. Define phenotype and genotype.
20. Show awareness of processes of biotechnology: fingerprinting, transformation and extraction.
21. Show awareness of various forms of electronic communication: e-mail, ftp, Worldwide Web.
22. Use e-mail to send a message.
23. Use the Worldwide Web to find information.
24. Describe value of technology in livestock production and in management.
25. Recognize the use of ultrasound in decision-making.
26. Recognize the use of electronic ID system in decision-making.
27. Describe the value of computerized record keeping for decision-making.

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